

Remarks

Applicant expresses appreciation to the Examiner for consideration of the subject patent application, and for the telephonic interview granted January 21, 2004, between the Examiner and Applicant's representative, Cliff Thompson. This paper is in response to the Office Action mailed October 22, 2003. Claims 1-3, 6, 8, 10, 14-16, 21-22 and 27 were rejected in the Office Action.

Claims 1-26 were originally presented. Claims 1-3, 6, 8, 10, 14-16, 21 and 22 remain in the application. Claim 27 was previously added and remains in the application. No claims have been canceled, added or amended in this Response.

Claim Rejections - 35 U.S.C. § 112

Claims 8, 10, 14-16 and 21- 22 stand rejected under 35 U.S.C. § 112, 2nd paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the Examiner stated that it "is not understood what is meant by substantially the same."

In the telephonic interview conducted January 21, 2004, Applicant's representative, Cliff Thompson, and the Examiner discussed the pending claims in light of the limitation in the claims of rotors having "substantially the same diameters." Applicant's representative re-presented Applicant's position that "substantially" is well known to those of ordinary skill in the art as being "that which is largely, but not wholly, that which is specified." Thus, rotors of substantially the same diameter have diameters of magnitudes that are "largely, but not wholly, the same."

As was discussed with the Examiner on January 21, 2004, Applicant respectfully submits that support for the limitation of rotors of "substantially the same" diameter is found in at least FIGs. 15, 16 and 17, and most specifically in FIG. 16 of the application as filed. Close examination of the rotors illustrated in FIG. 16 reveals that the rotor diameters differ by about 5% in length, in relation to the overall length illustrated in FIG. 15. Thus, support for the limitation of rotors having diameters of substantially (that is to say, largely, but not wholly) the same length is found in the disclosure as originally filed as at least one example of rotors having diameters (as far as visually discernable) of exactly the same size. Also, at least one example where the rotor diameters differ by a small amount (FIG. 16) is disclosed in the application as filed.

Based on the above discussion, Applicant respectfully submits that claims 8, 10, 14-16 and 21-22 are not indefinite, and do particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Further, as none of the references cited under the Examiner's 35 U.S.C. § 102 rejections include rotors with diameters of substantially the same size (per the foregoing), the § 102 rejections should be reconsidered and withdrawn.

Claim Rejections - 35 U.S.C. § 103

Independent claim 1 stands rejected under 35 U.S.C. § 103 as being unpatentable over Sweden (172,026) in view of Leon. Independent claim 1 includes the limitations of a helicopter having a coaxial rotor set, comprising "a first teeterable rotor carried by a first shaft" and "a second teeterable rotor carried by a second shaft" wherein the "first rotor is configured for cyclic pitch control, and the second rotor does not have cyclic pitch control [and] whereby pitch and roll

control of the helicopter by means of the coaxial helicopter rotor set is effected by cyclic pitch control of the first rotor."

Applicant respectfully submits that none of the references cited by the Examiner would suggest to one skilled in the art to provide teeterability to both rotors of a coaxial rotor set while providing cyclic pitch control to only one of the rotors. Conventional coaxial systems have been developed under conventional thinking, which dictates that providing cyclic pitch control to only one of a set of coaxial rotors may likely lead to the catastrophic event of the rotor without cyclic pitch control colliding with the rotor having cyclic pitch control. This can result, for example, when the rotor without cyclic pitch control cannot be manipulated out of the path of the rotor having cyclic pitch control.

The subject matter of claim 1 of the present application, however, can provide advantages not found in conventional coaxial rotor systems. For example, when cyclic pitch control is provided to only the top rotor, e.g. as shown in FIG. 12 of the present application, an extended length of the shaft between the rotors 14 and 15 can allow the top rotor to provide a large moment to the airframe of the craft to increase sensitivity of the craft to input control in pitch and roll. This inherently provides mitigation of reduced sensitivity where only one rotor of the coaxial rotor set is cyclically controlled.

Moreover, when cyclic pitch control is provided to the bottom rotor only, and teeterability is provided to both rotors of the coaxial set, teeterability of the upper rotor tends to lessen the resistance to pitch and roll control inputs to the airframe through the bottom rotor. These considerations are not taught nor suggested in the prior art. It is assumed that this is because the approach of providing two teeterable rotors in a coaxial rotor set with cyclic pitch control to only

one rotor is non-intuitive and, until applicant's work, has not been described in the art. Applicant has, against conventional wisdom, provided a simplified control scheme; and by the disclosure of this application taught how it can be put into practice. This is the intent of the patent statutes, to put the new way of doing something before the public, and to reward the inventor of that new way with a patent of time-limited scope commensurate with the advancement made.

With these considerations in mind, the Sweden reference teaches cyclic pitch control to one rotor (only) with teeterability provided on that cyclically controlled rotor only (the lower rotor of FIG. 5). The upper rotor (only) in that reference appears to be un-teeterable. Further, Leon teaches cyclic control of both rotors and teeterability of both rotors. The references combined do not show all elements of claim 1: i.e., teeterability of both rotors combined in a single rotor set with cyclic pitch control to only one rotor of the set. The cited references, in fact, teach away from the combination set forth in the claims in that they individually and together teach combination of teeterability with cyclic pitch control, and, if anything, teach providing one non-teeterable rotor of a coaxial rotor set where there is not cyclic control on that one rotor and there is cyclic on the other rotor.

As none of the references cited by the Examiner teach or suggest this combination of coaxial rotors being teeterable with only one of the rotors having cyclic pitch control, Applicant submits that independent claim 1 is allowable over the references cited and requests that the rejection be reconsidered, and withdrawn for the foregoing reasons.

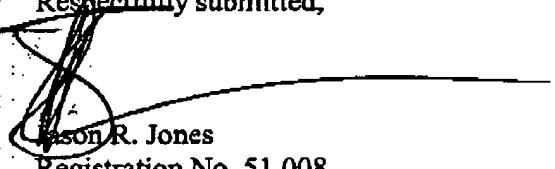
Conclusion

In light of the above comments, Applicant respectfully submits that pending claims 1-3, 6, 8, 10, 14-16, 21-22 and 27-28 are in condition for allowance. Therefore, Applicant requests that the rejections and objections be reconsidered, and that they be withdrawn, and the claims be allowed. If any impediment to the allowance of these claims remains after entry of this Amendment which would be amenable to resolution by telephone conference, the Examiner is encouraged to call Clifton W. Thompson or Jason R. Jones at (801) 566-6633 so that such matters may be resolved as expeditiously as possible.

The Commissioner is hereby authorized to charge Deposit Account No. 20-0100 for the fee required for a one-month extension of time pursuant to 37 C.F.R. 1.17(a)(1); and for any additional fee, or to credit any overpayment, in connection with this Amendment.

DATED this 23rd day of February, 2004.

Respectfully submitted,


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